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Systemic Causes of Abdominal Pain Part II

Neurological Diseases. Many neurological lesions in or near the abdomen cause localized pain and masquerade as intraperitoneal disease—organic or functional. Lesions affecting one or more of the spinal nerve roots often are overlooked when presenting abdominal pain since both patient and physician are accustomed to consider abdominal pain as being abdominal in origin. However, accurate localization of the lesion is usually possible.

Other neurological diseases cannot be localized to one spinal segment. Perhaps the most notorious example is tabes dorsalis in which the gastric crisis imitates an acute surgical abdomen. This clinical picture is not confined to tabes alone, as a similar crisis may occur in patients with diabetic neuropathy—pseudotabes diabeticum.

Migraine headaches and 'vascular' headaches similar to migraine often are accompanied by nausea and occasionally by vomiting. In this instance, it is important to remember that abdominal discomfort and nausea invariably associated with headache probably are not the result of intra-abdominal disease Abdominal migraine" is difficult to diagnose with any surety, the differentiation between it and other functional abdominal pains, such as pylorospasm and "spastic colon," being obscure.

Similar difficulties beset the diagnosis of abdominal epilepsy, a condition which actually occurs much less frequently than it is diagnosed. The diagnosis rests upon a specific series of signs and symptoms and a demonstration of a profound amelioration or disappearance of the attacks upon institution of adequate anticonvulsive therapy. Abdominal epilepsy and related types of abdominal pain originating in the brain can be "idiopathic" or due to various discoverable lesions—cerebral trauma, brain tumors, tuberous sclerosis, infectious and toxic encephalopathies, and familial degenerative diseases of the central nervous system.

Many diseases of the brain, particularly acute necrotizing or inflammatory conditions, such as apoplexy or bulbar poliomyelitis, may cause acute ulceration of the stomach or jejunum. In addition, neurological disorders of the brain and spinal cord that produce bowel difficulties due to weakness of the abdominal wall or to deficit in the nerve supply of the viscera may cause abdominal pain due to fecal impaction or diarrhea.

Glaucoma, while not ordinarily considered a neurological disease, probably produces abdominal symptoms through reflex nervous pathways. Nausea and vomiting are common in the acute 'congestive' form and it uncommonly happens that the patient in his desperation and misery fails to notice the blindness and only complains of 'stomach ache.'

A common abdominal or near-abdominal pain of unknown cause, proctalgia fugax, is mentioned because it more closely resembles a neuralgia than it does any other disease. This is a paroxysm of excruciating pain referred to a point

in the rectum an inch or more above the anus. The attacks last only a few minutes and appear so infrequently that no therapy is necessary or available in time. It occurs more often in men than in women and more frequently in sexually frustrated persons.

Hematological Diseases. In a number of diseases involving hematopoiesis or blood destruction, unexplained abdominal distress may be a presenting complaint. Such diseases are leukemia, hemolytic anemias of various kinds, transfusion reactions, myelophthisic anemias, polycythemia vera, hemophilia or other coagulation defects, and multiple myeloma. In many of these situations abdominal pain is due to a complication, such as uric acid, kidney stones, peptic ulcer, or splenic infarcts in polycythemia; hemorrhage into the retroperitoneal structures, mesocolon, peritoneal cavity, or bowel wall in hemophilia bone destruction in multiple myeloma and deep bone pain in leukemia Mild abdominal distress has been reported in pernicious anemia, iron deficiency anemias, and aplastic anemias.

In sickle cell disease, abdominal crises are particularly apt to be severe. In some hybrid types the dramatic intensity of the pain may be out of all proportion to the quantity of hemolysis. Jaundice may be absent and anemia negligible.

The whole problem of abdominal pain in hemolytic anemias is complicated by the greater tendency of such patients to develop hepatic dysfunction and gall-stones.

Mechanical and Physical Trauma. Any severe injury—from a broken leg to a scalded hand—is very likely to interfere with normal muscular movements of the gastrointestinal tract, resulting in a wide range of symptoms from nausea and vomiting to severe pain occurring with paralytic ileus. Acute gastric dilatation may give rise to mild to severe upper abdominal pain, bloating, or nausea; or sudden development of profuse sweating, tachypnea, anxiety, tachycardia, pallor, low blood pressure, and other signs of shock, with progression to death.

Motion sickness occasionally evokes the complaint of a "stomach ache" which may be more the result of physical inactivity or prolonged maintenance of a supine position than the immediate effect of reaction to motion itself.

Radiation sickness ordinarily produces nausea, but not abdominal pain. However, the condition may be associated with discomfort if food has been eaten and retained despite nausea. Radar equipment can, like diathermy apparatus, inflict visceral or subcutaneous burns. If peritoneal structures are involved, the pain may be anything from an "intense heat" to ordinary types of abdominal pain arising from visceral inflammation. Ultrasound involves similar hazards.

Severe cramping or vise-like pains, usually abdominal and often in the back and limbs as well, sometimes are produced when bubbles of gas are liberated into the blood stream. This occurs in instances of rapid reduction in atmospheric pressure either in sudden return to normal from increased pressure, or rapid ascent to low barometric pressure in flying—"bends," Caisson disease, "or "flyer's bends."

Psychiatric Disorders. A great variety of abdominal pains may arise from emotionally-produced disordered motor function of the gastrointestinal tract. Among the types are: functional cardiospasm or pylorospasm; periumbilical cramps with rapid motility of the small intestine; bloating discomfort, painful constipation, or colicky diarrhea due to emotional influences upon the colon, and sharp left upper quadrant pain aggravated by breathing and sometimes simulating angina pectoris when a gas-filled splenic flexure presses upon the diaphragm. Anxiety, fear, resentment, and frustration can produce pain similar to the pain of most so-called "organic" intra-abdominal diseases. Usually, abdominal pain of emotional origin can be recognized as the symptom of dysfunction in the stomach, small bowel, or colon. It is important to localize the pain anatomically because the selection of diagnostic procedures is simplified and the patient frequently derives comfort from knowledge that his pain arises in the colon, whereas the bald assertion that the pain arises in his head" leads to confusion, disbelief, and antagonism.

In a small number of instances, abdominal pain is not due to smooth muscular dysfunction but to hysteria. This type of abdominal pain often is constant and unchanging for long periods of time and is not accompanied by the facial expressions and activities that one associates with a human being suffering from the degree of pain the patient claims to have.

Nonanalgesic sedatives will do little or nothing to the abdominal pain that is caused by opiate withdrawal in a patient addicted to narcotics. It is all but impossible to separate the anxiety from the pain as each aggravates the other

Apart from opiate addiction, malingering rarely is a cause of abdominal pain in general practice. It occurs, however, in the child wishing to escape punishment or education, the soldier seeking to evade an unpleasant or dangerous assignment, in medicolegal or insurance compensation problems, and sometimes as a result of peculiar psychiatric aberrations, particularly in persons who have some familiarity with medicine. (Mellinkoff, S.M. Systemic Causes of Abdominal Pain - Part II: Am. J. Digest. Dis., 4: 642-653, August 1959) (Part I of this article appeared in the Medical News Letter, 4 September 1959)

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Change of Address

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Meckel's Diverticulum at a Children's Hospital

Occurring in one out of 50 persons, Meckel's diverticulum usually remains hidden, but may emerge wearing various disguises. This small appendage may cause the borborygmus clamor of an acute intestinal obstruction on one occasion; at another time, it may assume the pallid countenance of an unexplained anemia. Even when simulating the McBurney point pain of acute appendicitis, the masquerader succeeds in deceiving nearly every one.

A review of the experience at the Buffalo Children's Hospital for the past 15 years revealed that 61 children underwent removal of a Meckel's diverticulum for various causes: 17 for intestinal obstruction; 15 each for anemia and recurrent abdominal pain; 7 for perforation with peritonitis; 6 as an incidental procedure to other operations and one associated with a draining umbilical sinus

Disease of Meckel's diverticulum, because symptoms vary with the anatomic and physiologic disturbances resulting from specific affection, may be obscure, particularly in children with gastrointestinal tract bleeding and abdominal pain. Therefore, with signs of intestinal obstruction, peritoneal irritation, or severe anemia, this anomaly should be considered.

Of the 15 children presenting anemia because of gastrointestinal tract bleeding, 11 had massive hemorrhage. Emergency laparotomy was not performed, with intervention being delayed until stabilization of vital signs by blood replacement and subsequent investigation for source of bleeding had been accomplished.

In those patients who presented with intestinal obstruction as the primary complaint, the mechanism was intussusception in 10 and volvulus in 7. These children were acutely ill and demanded urgent operative intervention. In the latter group, the symptomatology did not arouse suspicion of Meckel's diverticulum as being the causative factor of the obstruction.

Of the 22 patients presenting abdominal pain, there were two types: those with acute episodes and evidence of peritonitis and those with recurrent attacks without symptoms of intestinal obstruction. In the latter group, laparotomy was performed as a diagnostic procedure after all other measures had not revealed the cause of the pain.

The authors consider the choice of operative procedure requires individual selection at the time of operation. Primary anastomosis in the presence of intestinal obstruction presents excellent prognosis. However, Mikulicz's resection should be kept in mind'as the operation of choice for the severely ill patient or the child whose intestine is so edematous and friable that primary anastomosis is dangerous

Of the group reported, one death occurred—that of a moribund child in whom peritonitis was masked by steroid therapy for Henoch's purpura. (Jewett, T.C., et al., Meckel's Diverticulum: The Abdominal Masquerader: Surgery, 46: 440-443, August 1959)

Myelofibrosis

Myelofibrosis is an unusual disease characterized by fibrotic or sclerotic bone marrow and extramedullary hematopoiesis. First described in 1871, attention was redirected to it during the third decade of this century and it has been better recognized since that time. Myelofibrosis has been described under a number of terms—agnogenic myeloid metaplasia, aleukemic myelosis, megakaryocytic myelosis, leukoerythroblastic anemia, myelosclerosis, and osteosclerosis. Considerable interest has arisen during recent years in regard to its relationship to polycythemia vera and chronic myelocytic leukemia.

The etiology of myelofibrosis in the majority of instances is unknown. Exposure to benzene or other bone marrow toxins has been recognized by many as an important factor in the development of the condition which results in necrosis and finally fibrosis of the bone marrow with compensatory extramedullary hematopoiesis. Also, it is known that 10 to 20% of cases of polycythemia vera and some cases of chronic myelocytic leukemia terminate as myelofibrosis, although the reverse process more frequently occurs in leukemia. In recent years, the concept has been popular that polycythemia vera, chronic myelocytic leukemia, and myelofibrosis are merely different phases of 'myeloproliferative disease.'

The essential pathologic finding is fibrosis of the bone marrow with complete replacement by fibrous tissue in some instances. There may be patchy areas of very active hypercellular marrow and, characteristically, there is megakaryocytic hyperplasia. There may be overgrowth of bone along the trabeculae producing sclerosis of bone. Marked extramedullary hematopoiesis occurs. It is most striking in the spleen, less conspicuous in the liver and lymph nodes, and minimal in the kidneys, lungs, and other organs.

Usually occurring in the older age group, it is equally frequent in both sexes. The onset is insidious with presenting symptoms of weakness, fatigue dyspnea, and weight loss. Abdominal pain due to the enlarged spleen may be a feature as may be a bleeding tendency.

The blood picture is variable with marked changes of the circulating red cells and increase of leukocytes (occasionally low) with a leukemoid left shift of the differential white blood cell count. Platelets are usually normal or low, but occasionally may be strikingly elevated. The picture may be that of chronic myelocytic leukemia. Bone marrow aspiration is unsatisfactory, biopsy being required to accurately establish the diagnosis. Progressive anemia, frequently of a hemolytic nature, is the common picture with the course characterized by bleeding phenomena, infection, and splenic infarction terminating as chronic myelocytic leukemia. Duration after diagnosis varies from a few months to many years, the average being around 3 to 4 years.

Myelofibrosis may produce the following roentgen findings: (1) Splenomegaly. This is an almost constant feature without any specific diagnostic

characteristics (2) Hepatomegaly. A less common feature which is more difficult to evaluate roentgenologically (3) Osteosclerosis. This is diffuse rather than localized, without expansion of the involved bones or change in external contour. The alteration is due to thickening of the individual bone trabeculae of the spongiosa and in some cases formation of new trabeculae. Apparently, there is no periosteal proliferation of bone, although there may be endosteal thickening which involves the diaphyses of long bones. The bones exhibiting more apparent changes are the ribs, pelvis, vertebrae, clavicles, and scapulae. In many cases only a diffuse increased density of the bones with some increased prominence of the trabeculae is seen. In more advanced cases of osteosclerosis there are frequently found discrete sclerotic foci in addition to the general osteosclerosis.

Although there are a great many conditions which produce osteosclerosis, it is most unusual to encounter a disease which closely simulates the sclerosis of myelofibrosis. The bone lesions may be closely mimicked by certain cases of metastatic carcinoma and the rare osteosclerotic form of myelomatosis. Several other entities at times show osteosclerosis and splenomegaly which may be considered in differential diagnosis: Hodgkin's disease, leukemia, hemolytic anemia as Cooley's and sickle cell anemia, and Albers-Schönberg's disease.

Treatment of myelofibrosis for the most part consists of symptomatic and supportive measures. Blood transfusions should be given sparingly with the guide being symptoms rather than hemoglobin level. If a significant degree of hemolysis is present, treatment with adrenocortical steroids may prove beneficial. Splenectomy is considered hazardous, although in carefully selected patients in whom there had been a significant degree of splenic sequestration and destruction of red blood cells, splenectomy was shown to be beneficial. Suppression of granulopoiesis by the use of myleran occasionally may be of benefit, and irradiation of the spleen has been employed frequently with varying results.

The authors review 25 cases of myelofibrosis seen from 1948 to 1958 and emphasize the frequency and types of bone changes that may be encountered roentgenographically, which changes they consider to be characteristic of the disease. (Leigh, T.F., et al., Myelofibrosis - The General and Radiologic Findings in 25 Proved Cases: Am. J. Roentgenol., 82: 183-193, August 1959)

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Results of Treatment of Malignant Melanoma

Reporting from the Memorial Center for Cancer, the author statistically compares the experience with 1,190 cases of malignant melanoma treated and followed from January 1917 through December 1950 and another group of 189 patients confined to the period, January 1948 through December 1950. From these groups, comparable 5-year period end result studies are made. Reviewing the data, the author considers that it is possible to determine whether improvement in methods of therapy has occurred and to accredit such betterment to certain principles and technique of therapy.

Although the prevention of malignant melanoma has no bearing on the end results of treatment of melanomas already established, certain relevant facts about moles established during the past decade are presented. Among these facts are the frequency of mole and the rarity of melanoma occurrence which confirms the existing policy of not excising all moles. Another fact is the development of melanomas during pregnancy which justifies the surgical excision of selected darkening moles during the early period of gestation. With increasing experience, the theory that physical trauma can convert a benign mole to a malignant lesion is probably becoming untenable.

An excisional biopsy for melanoma is done only when the primary lesion is very large, ulcerating, and fungating; even then it is done with utmost gentleness. Small skin lesions suspected of being melanoma are excised in toto rather than incised. If a malignant melanoma is found, a three-dimensional dissection should be widely and ruthlessly performed. If the melanoma is situated in relatively close proximity to the regional lymph nodes into which one might reasonably expect lymph-borne metastases to be deposited, the lesion may lend itself to a radical dissection—monobloc excision or excision and dissection in continuity. The author suggests that a situation may exist wherein the primary malignant melanoma is situated in the skin at a remote site from the regional lymph nodes involved by metastasis. Under these circumstances, the recommended procedure is amputation or exarticulation of the extremity and dissection of the regional lymph nodes.

Melanomas on the exposed skin of the face are detected earlier than elsewhere with the exception of the hand. Therefore, early and definitive treatment with improved prognosis—better than for other locations—is now experienced. In the 1948-1951 series, the 5-year definitive cure rate was 39.5% compared to 18% from 1917 to 1945.

Because of the vascularity of the region and frequency of blood-borne metastases, malignant melanomas of the scalp have been extremely dangerous. The scalping excision should be wide and skin grafting should always be necessary.

Only 2.5% of melanomas occur in the oronasal mucosa, usually on the superior or inferior alveoli or on the palate—a region seldom routinely

examined. Treatment has been by radical surgical excision with only three absolute cures reported.

The comparative incidence of moles to malignant melanomas occurring in the skin of the trunk is a ratio of approximately 5 to 3. Regional metastases to nodes may be widespread. The type of local excision is three-dimensional with wide sacrifice of skin and fascia. The outlook for these patients has improved over the years with a current 31.2%, 5-year cure rate in the author's series.

Of 14,609 nevi counted in adult white patients, only 14 pigmented moles were discovered on the vulva and penis—0.1% of all moles as compared with 2.8% of 1,222 melanomas. Prophylactic excision of all genital nevi should be done, with a more radical procedure for an established melanoma with or without metastases. Four of 25 patients with melanoma of the female and male genitals were cured (16%).

Malignant melanomas of the anorectal canal require radical abdominoperineal rectal resection even more urgently than is indicated for the average adenocarcinoma of the rectum. This includes a pelvic lymph node dissection and bilateral dissection of the inguinal and femoral lymph nodes in continuity with the anus.

Pigmented nevi are not so frequently encountered in the nail bed, but should be surgically excised in their entirety. The frequency is approximately 3 to 3.5% of all melanomas, occurring more often on the toes than on the fingers. The subungual melanomas in one series comprised 44.8% of all melanomas of the hand and 13.1% of all melanomas of the feet. Amputation should be above the level of the metacarpophalangeal joint for better functional, cosmetic, and curative results. Of 29 cases treated between 1935 and 1950, the absolute cure rate was 20.7%.

In the 16-year period, 1935 to 1950, 16.5% of all malignant melanomas were on the hands (29) and feet (122). In 32 instances, local surgical measures were employed with a 5-year definitive cure rate of 34.4%; the cure rate for all melanomas of the feet was 25.3%. The latter figure reflects the high mortality resulting when regional metastasis has occurred, and more radical procedures are mandated. For patients with malignant melanomas of the feet having simultaneous nodal metastases in the groin, the 5-year definitive cure rate was only 12%. A direct proportion between the diameter of the lesion and survival was conspicuous, with those having a lesion 4 to 5 cm. in diameter resulting in a cure rate of 10%. The total 5-year definitive cure rate for melanomas of the hand was 40%, with a 16.6% cure rate when metastases were present in the axilla.

In comparing the collective end results of earlier years with the present series on the basis of primary location, the following data is presented. This improvement can be attributed to: (1) abandonment of radiation therapy as a primary therapeutic procedure; (2) education of the lay public and medical profession about hazards of certain pigmented skin lesions, resulting in earlier

diagnoses; (3) institution of surgical treatment at a time when the primary melanoma often remains localized; and (4) more adequate surgical procedures for melanomas—both local and metastatic to regional nodes—based on the principles previously stated.

Location	Prior to 1946	Present
Head and neck	18.0%	39.5%
Trunk	13.7%	31.2%
Lower extremity	30.6%	42.4%
Total experience	21.4%	37.7%

(Pack G. T., End Results in the Treatment of Malignant Melanoma: Surgery, 46: 447-459, August 1959)

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Paget's Disease

Paget's disease is a chronic affection of bones resulting in distortion of architecture and alteration of density. It may be isolated or widespread, symptomatic or asymptomatic. Almost invariably, it involves the skull and those portions of the skeleton which are subject to the greatest stress—vertebrae, pelvis, and extremities. Characteristic deformities produced by change in the bone were best described by James Paget in the latter part of the 19th century.

The frequency of the disease varies from an estimated 3%, as observed by Schmorl at necropsy, to about 0.1% in a study of a general hospital population. This takes on added significance when it is considered that diabetes mellitus is observed clinically in slightly less than 2% of the population as a whole.

Paget's disease is most commonly observed between the 40th and 60th years; it occurs twice as frequently in men as in women, and exhibits no relation to race, but seems to have a familial tendency.

The cause of osteitis deformans is unknown. Studies involving metabolism abnormalities are hampered by the fact that the abnormality has never been produced in laboratory animals.

Pain is a common symptom of Paget's disease with back pain frequently being caused by collapse of vertebral bodies. Nocturnal cramps of the legs, when comprising a part of the symptom complex, are best explained on the basis of coincident atherosclerosis of the peripheral arteries. Pain in the long bones is believed to be due to tortions of the periosteum as a result of hyperemia, overgrowth of abnormal bone, and abnormal relationship of periosteum to bone.

The fundamental lesion of Paget's disease is one of bone destruction. The resultant weakness makes the involved bone more susceptible to trauma and stress; this in turn stimulates an overproduction of bone through the osteoblasts. The work of the osteoblasts is never carried to completion and the alternating destruction and repair of bone bring about a change characteristic of the disease.

The microscopic picture is one of absorption of bone associated with over-production of poorly calcified bone so that the disease may be divided into (1) the osteoclastic absorption of bone; (2) the osteoblastic formation of new bone without calcification; and (3) the osteoblastic formation of new bone with calcification. Any combination of these phases may predominate.

There are usually no changes in the serum calcium and phosphorus levels because the osteoporosis of Paget's disease is caused by a disturbance in tissue metabolism, and calcium metabolism is involved only secondarily. Hypercalciuria occurs, particularly when the patient is confined to bed; such a circumstance increases the likelihood of formation of renal calculi. Although the serum alkaline phosphatase is usually elevated, the serum calcium and acid phosphatase are within normal limits. The serum alkaline phosphatase level is almost directly porportional to the degree of bony involvement and can be fairly well correlated with the bony changes as demonstrated by roentgenologic methods.

One of the most interesting aspects of Paget's disease is the involvement of the cardiovascular system. Plethysmographic studies indicate that there is an increase in blood flow through the bone sufficient to produce changes in the general circulation which are similar to those of an arteriovenous shunt. High pulse pressure is characteristic, and enlargement of the heart and systolic murmurs are frequently observed. It has been shown that there are no significant changes in cardiac output when the disease is monostatic, but in generalized expression of the disease the circulation is greatly increased. In the latter cases, one may expect evidence of cardiac failure. Occasionally, the cardiac output may be increased up to 20 times that of normal. One investigator concluded that cardiac output was increased only when not less than 35% of the skeleton was involved.

Arteriosclerotic or hypertensive cardiovascular disease is not an infrequent concomitant occurrence. Of interest is the report of valvular calcification which is assumed to be a result of disturbed calcium metabolism.

From reports of various observers, it would appear that Paget's disease may be considered a presarcomatous lesion. When a diagnosis of bone sarcoma is made, thorough examination of the skeleton should be conducted for evidence of Paget's disease.

Among other complications are extensive choroidal changes, retinal hemorrhages, optic atrophy (possibly due to compression of the optic nerve by bone changes in the skull), diplopia, keratitis, and corneal opacities. The classical x-ray picture of Paget's disease is one of change in the architecture

of the cortex and medulla as well as varying degrees of hyperplasia or thickening of bone incident to the activity of osteoblasts. Changes in the skull and pelvis are described as presenting a cotton-wool appearance. There may be enlargement of the involved part of the skeleton with flattening, along with specific changes of localized areas. Among typical findings, perhaps the major ones are: (1) widespread honeycomb or spongy appearance; (2) striated appearance in pelvis and sacrum; (3) uniform and increased density in the vertebrae; and (4) true cystic areas of pelvis and long bones.

Although there are some reports of benefits from the use of steroids, there is no known treatment for Paget's disease. Some investigators believe that a decrease in bone absorption is brought about by an increase of calcium and phosphorus intake as well as administration of large doses of vitamin D. Continued activity and full ambulation of patients is urged since it is well recognized that immobilization results in decrease in bone repair, and osteoporosis of disuse accentuates that resulting from the physiologic processes of the diseased bone. (Engelhardt, H. T., Earl, D. M., Baird, V. C., Paget's Disease - Current Concepts as Exemplified by Case Histories: Geriatrics, 14: 500-510, August 1959)

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Vitamin B12 and Folic Acid in Medical Practice

Vitamin B₁₂ and folic acid are now established parts of the complex of essential nutrients often referred to as the "B vitamins." Since they are nontoxic—at least to normal individuals—they are dispensed freely in multivitamin pills and are prescribed promiscuously on a nonspecific or "tonic" basis for patients with a variety of ailments.

Folic acid was the first to be discovered as the culmination of a series of independent observations. It is a nutrient essential for bacteria, avian and mammalian species, and man. It is particularly concerned with metabolic reactions involving synthesis of essential amino acids and constituents of nucleoproteins. In hematopoiesis, its lack results in abnormal blood formation characterized by megaloblastic erythropoiesis, abnormal leukopoiesis, and formation of a deformed, abnormally large, red blood cell with a shortened life span.

The effect of folic acid in pernicious anemia is limited to the blood, in many cases aggravating the neurologic lesions of that disease. It cures other megaloblastic anemias, such as sprue, nutritional anemias, and anemias of infancy and pregnancy.

Following the discovery by Minot and Murphy that ingestion of liver cured pernicious anemia, the search for the factor responsible for this effect was relentless. By 1947, some crystals containing cobalt were isolated and

designated vitamin \mathbf{B}_{12} . Clinical studies followed immediately with well known success.

The complete details of the biologic effects of these substances have not been clarified. However, it is believed that both are involved in the synthesis of DNA (deoxyribonucleic acid) of the cell nucleus. The exact steps in the synthesis where each one works are not yet established. Both are essential and when one is given, the reaction involving the other is speeded up. When the concentration of either reaches a low level, the reaction of nucleoprotein synthesis cannot go on and megaloblastic red blood cell formation results. Under these conditions, the use of the vitamin that is not lacking may have a slight effect, good effect, or no effect. A good effect is followed by a period of refractoriness. Therefore, those patients with pernicious anemia who respond to folic acid sooner or later will require larger and larger doses and eventually will become totally refractory to it. In addition to the role in hematopoiesis, vitamin B₁₂ still plays an obscure but essential role in preservation of neuronal integrity.

Daily requirements for vitamin B₁₂ are so small that it is almost impossible to find a diet so deficient in it that signs or symptoms of deficiency will develop. Deficiency is almost always the result of defective absorption of the vitamin from the gastrointestinal tract which is a specific function of the small intestine, actuated by an enzyme of the gastric mucosa—the "intrinsic factor" of Castle.

After absorption, vitamin B_{12} is bound to a beta globulin in the blood stream and transported to the tissues and the liver for storage. Since the binding protein in the blood is limited in amount, doses of the vitamin in excess of 50 mcg. are carried in the uncombined or free form. The bound form cannot pass the kidney barrier while the free form is rapidly excreted during the first 24 hours following injection.

It is apparent that the two vitamins discussed—although having much in common—cannot be used interchangeably. Vitamin B_{12} is the missing factor in pernicious anemia and folic acid is specific for the other megaloblastic anemias.

Sprue is a malabsorption syndrome responding well to folic acid, orally or parenterally, although there is a group of patients with sprue that show an abnormal absorption of vitamin B_{12} and, therefore, should receive both substances when receiving therapy.

The dosage of folic acid is 5 mg. daily until remission is obtained. The patient with sprue may require maintenance therapy. Vitamin B₁₂ for the patient with pernicious anemia is given intramuscularly, 50 mcg. weekly. After response, a maintenance schedule of an injection every 2 weeks is preferred to a monthly injection. Patients with degenerative spinal cord disease should be treated more vigorously—50 mcg. three times a week until remission, then maintenance injections every week.

In recent years, the market has been flooded with oral preparations containing vitamin B12 and concentrates of intrinsic factor. The uncertainty

of action of these preparations and their expense should discourage their use. The use of either folic acid or vitamin B_{12} in anemia or neurological conditions of types other than those discussed has not resulted in definite evidence of effectiveness. Any benefits reported are considered to be psychologic.

Specific admonitions by the author are:

- (1) Don't give folic acid to patients with pernicious anemia. Several cases of severe cord disease have developed in patients who did not know they had pernicious anemia and were taking multivitamin pills which contained folic acid. Don't prescribe them.
- (2) Don't waste large oral doses of vitamin B_{12} on patients who do not have pernicious anemia or small ones on patients who do.
- (3) Don't give injections of vitamin B_{12} greater than 50 mcg. unless there is some particular reason for it, psychologic or experimental. (Reisner, E. H., Jr., Vitamin B_{12} and Folic Acid in Medical Practice: GP, XX: 94-97, August 1959)

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Tired Mother Syndrome

Most young mothers are tired. Some are tired occasionally, others almost all the time. Seldom is this fatigue due to organic disease. There are just too many things for them to do in too short a time! A tired mother is not necessarily maladjusted—she is spent; not burdened with guilt—merely overly conscientious; and, most important of all, she is not sick—just tired.

Physicians, in their desire to be of service, often forget this, as witness the long list of medications prescribed to be swallowed or injected for the relief of fatigue. Study indicates strongly that young mothers are supposed to be tired and supports the concept of an entity called the tired-mother syndrome.

Because fatigue cannot be measured objectively, the severity of the problem largely depends on how graphic a description the patient herself offers. The syndrome usually afflicts a worrisome, tense, overly conscientious mother who cannot quite keep up with all the tasks she has set for herself. She begins to feel tired, run-down, and irritable; any of a large number of somatic symptoms may develop which worry and confuse her. Her reading of medical articles in women's magazines having acquainted her with a number of major diseases, she soon is prepared to accept the fact that she has one or even several of them.

Some women are beset with great problems—others with only a neverending series of minor ones. Despite labor saving devices at home, life has become more complicated—not less. The modern mother is required to be handyman, chauffeur, child psychologist, and clubwoman. Her calendar is crowded with many activities. Of the subtypes of tired mothers, the working mother is a common one. The older mother type has a difficult time—for her, all activities of the usually busy mother are just a bit more difficult. The displaced-person tired mother type is a woman-in-a-hurry. In addition, there are those individuals with a low or high energy reserve, both of which types may overspend their supply, resulting in a negative balance and weariness.

The amount of work accomplished is not necessarily an index of the amount of nervous energy used, since worry, indecision, and unhappiness drain off more than does purposeful activity. Thus, the tired mother may be constantly fatigued even though she accomplishes little.

Over several months, 211 women with the complaint of tiredness were given complete general physical examinations. Of these women, 60 had one child or more under 16 years of age. Twenty-eight subjects lised as "normal" tired mothers were women of average emotional stability without any major problems contributing to a situational anxiety reaction. They were just trying to do too much.

Analysis shows that the number of children being reared by tired mothers has no bearing on the problem. Apparently, a tired mother with one child worries four times as much per child as the mother with four children.

Prior to being observed by the author, the usual treatment given to the patients in this series had been vitamin injections with vitamin B_{12} leading the list-more popular than vitamin B_1 or tranquilizers. Six patients were given estrogens without being menopausal.

The results of treatment depend on how much underlying neurosis is present. In the relatively "pure" tired-mother syndrome almost anything seems to be effective since the condition is self-limited. Unfortunately, in the offices of too many harried physicians, three main methods of treatment are utilized:

- l. Substitution method. An organic-sounding term is used to explain the fatigue, although no organic disease actually is present. This substitute organic condition—"anemia, " "low blood pressure, " "hypometabolism" "female trouble"—may then be treated vigorously.
- 2. Subtraction method. In this system, the fatigue is blamed on some bad habit. The offending agent—excessive eating, tobacco, coffee, alcohol—is therefore subtracted or taken away. The discerning physician can find something to take away from almost everyone.
- 3. Subalimentation theory. The proponents of this theory hold that when no organic disease can be demonstrated, chronic fatigue must be due to poor eating habits and subsequent lack of vitamins. The efficacy of various vitamin preparations in prevention and treatment of ordinary nervous fatigue can be judged by the fact that while consumption of them is at an all-time high, so, too, is the number of tired people.

It is important to realize that most tired mothers are not being treated by the medical profession. Spurred on by lurid commercial advertising and quiz show sponsors, tired people throughout the land are turning to patent medicines for infusions of pep and energy. The fountain of youth has been discovered on Madison Avenue; its elixir has been bottled, labeled, and distributed so that all can partake of it. The concept of "tired blood" may not be based on sound medical principles, but it represents a triumphant example of the adman's art.

Following the preferred method of treatment, use of placebos and other psychologic aids under the supervision of the medical profession is not to be condemned. Emotional support always has been—and will remain—one of the most valuable phases of therapy. However, in management of the tired—mother syndrome, no medication can take the place of the physician's forthright assurance based on confidence acquired from a careful and thorough physical examination. The non-neurotic mother appreciates knowing that all mothers are tired at one time or another and that her complaint is not unusual.

Medication can and should be used for symptomatic relief. When fatigue is a manifestation of underlying neurosis, treatment is much more difficult. Particularly tragic are those instances associated with serious situational problems that cannot be resolved. Beyond measures contributed by the physician, there are many other things that may induce remission—often simple things, but important just the same.

Fortunately, the majority of tired mothers are not afflicted with neuroses. The physician must teach her that individuals are born with variable amounts of drive and nervous energy and that each must learn to live within her supply. (Lovshin, L. L., The Tired Mother Syndrome: Postgrad. Med., 26: 48-54, August 1959)

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BUMED INSTRUCTION 6230. 10

25 August 1959

From: Chief, Bureau of Medicine and Surgery

To: Ships and Stations Having Medical Corps Personnel

Subj: Vaccinia immune globulin; availability of

The purpose of this instruction is to advise addressees of the availability of vaccinia immune globulin for treatment of military personnel and their dependents with early cases of generalized vaccinia, eczema vaccinatum, progressive vaccinia, vaccinia necrosum, and other serious complications of smallpox vaccination.

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Letters of Congratulation

On the occasion of the 117th anniversary of the establishment of the Bureau of Medicine and Surgery which was observed on 31 August 1959, Rear Admiral Bartholomew W. Hogan, Surgeon General of the Navy received the following congratulatory letters:

"I have the honor to extend heartiest congratulations and best wishes from the United States Marine Corps to you and to the other members of the Navy Medical Corps upon the occasion of the 117th anniversary of your organization.

An anniversary is an occasion for reflection, and you can reflect with the deepest pride upon the distinguished record of the Navy Medical Corps over the years. It is a record of courage, devotion to duty, high professional competence, and compassionate service to humanity. We Marines have the highest esteem for all of you, and we cherish the strong bonds of friendship which have developed through the years between the Navy Medical Corps and the Marine Corps.

With warmest personal regards and every good wish for the continued success of your Corps throughout the years ahead, I remain.

Sincerely,

s // R. McC. Pate
Commandant
U.S. Marine Corps"

"On 31 August 1959, the Navy Bureau of Medicine and Surgery will celebrate its 117th anniversary. The entire Army Medical Service joints me in offering congratulations and best wishes for another peaceful, productive year ahead.

Sincerely,

s // Leonard D. Heaton Major General, MC The Surgeon General"

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From the Notebook

Space Suit. Navy's newest aluminized full pressure omni-environmental suit, in competition with other pressure suits, was selected for use by the astronauts who are to fly in Project Mercury. This suit was developed by the Air Crew Equipment Laboratory at Philadelphia under the direction of Naval Aviation Medicine personnel. The space capsule destined to carry the first astronaut will be tested by the Navy at the same laboratory.

Armed Forces Medical Journal. The October issue of the United States Armed Forces Medical Journal will present an entirely new appearance. COL Robert J. Benford USAF MC, editor, announces that letterpress printing will be employed replacing the varitype photo-offset method which has been used for many years. This will give the Journal a more attractive aspect and easier to read type. In other regards, much of the appearance of the Journal has been altered, including the cover which will be distinctive and modern. Introduction of new features and other interesting changes are being planned for issues in the near future.

ADA Meeting. LCDR Lucille R. Clark, MSC USN and LT(jg) Martha J. Svete MSC USNR, both stationed at U.S. Naval Hospital, San Diego, represented the Bureau of Medicine and Surgery at the 42nd Annual Meeting of the American Dietetic Association at Los Angeles, 25-27 August 1959. During the sessions these officers monitored a booth which contained a series of enlarged color photographs depicting the professional duties of the Navy dietitian.

Left Ventricular Hypertrophy. Evaluating the reliability of criteria for electro-cardiographic diagnosis of left ventricular hypertrophy, correlation of the features of tracings with anatomical findings was made in 200 successive patients who exhibited left ventricular hypertrophy at autopsy. The most significant abnormalities were the characteristic ST-segment and T-wave changes which were seen in 55%(80% if patients with obvious myocardial infarction or bundle-branch block were excluded). Amplitude of the QRS complex was quite unreliable, with only 22% showing this variation. (A. H. Griep, Circulation, July 1959)

Acute Cholecystitis. The author endorses the conservative treatment of acute cholecystitis, including nasogastric suction, intravenous fluids, sedation and occasionally antibiotics. When surgery is required, simple gallbladder drainage is often adequate. Acute cholecystitis presents special problems in older patients. Possibility of gallbladder rupture is not a valid excuse for immediate surgery. (E. T. Thieme, GP, August 1959)

Gastric Pepsin. Cognizant of the possibility of a relationship between ABO blood groups and secretion of gastric pepsin with increased frequency of peptic ulcer disease in patients with polycythemia and leukemia, the authors reviewed a series of patients. The excess of group O blood type and concentration of plasma pepsinogen was not significant in the patients with either disease. The increased occurrence of peptic ulcer claimed for these two diseases, if indeed real, they considered to be due to factors other than elevated acid-pepsin activity. (M. L. Sievers, P. Calabresi, Am. J. Dig. Dis., July 1959)

Thymectomy in Myasthenia Gravis. From review of current literature and their own experience, the authors conclude that most young women with myasthenia gravis of 2 to 3 years duration and no evidence of thymic tumor should undergo exploration as well as all patients with suspected thymic tumors with or without myasthenia gravis. Thymectomy in male patients and radiation therapy is considered to be of doubtful value. (H. H. Olson, et al., Am. J. Surg., August 1959)

Coronary Vasodilator. Vasoflex (N-cinnamyl-methylamino-2-phenylpropane hydrochloride), a drug related to the catechol amines, was studied by the authors. Their findings confirm that a vasodilating effect results from intravenous use, without any marked alteration of heart rate and arterial blood pressure, but accompanied by an increased cardiac output, left ventricular work, and left ventricular oxygen utilization. Therefore no net benefit is realized. (E. Traks, et al., Ann. Int. Med., July 1959)

Serum Amylase Test. This test alone cannot be used to differentiate between obstructive biliary lithiasis without pancreatitis, pancreatitis without biliary lithiasis, and concomitant pancreatitis and biliary lithiasis. Elevations of the serum amylase above 500 Somogyi units/100 ml. may occur in the complete absence of demonstrable pancreatic disease. Accurate assessment of the merits of "conservative" or "nonoperative" regimens of treatment of acute pancreatitis is impossible—the diagnosis of pancreatitis cannot be made with certainty without an autopsy or celiotomy. (H. Bernard, A. M. A. Arch. Surg., August 1959)

Liver and Tuberculosis. Until recently the liver seldom has been considered to be a site of tuberculous involvement except in cases of acute miliary tuberculosis or as a result of terminal hematogenous dissemination. Performing liver function tests in 50 patients with extrapulmonary tuberculosis, abnormalities of hepatic function and plasma proteins were demonstrated in almost all patients. A high incidence of granulomas and other histologic changes were observed in the liver biopsy specimens of 30 patients. (R. J. Korn, et al., Am. J. Med., July 1959)

Wound Infections. Study of acute traumatic and elective surgical wounds indicates that bacteria which are present at the time of wound closure are the origin of surgical wound infection. Meticulous wound excision followed by copious irrigation with normal saline will reduce the incidence of wound infection—antibiotics will not. (F. P. Shidler, Am. J. Surg., August 1959)

Bacteria in Liver Disease. From their study of patients with various diseases of the liver, the authors conclude that the data available suggests that bacteria are not ordinarily found in the human liver or portal vein blood, but that they may invade the portal vein under unusual physiologic circumstances, such as abdominal trauma, surgery, irradiation, shock, anoxia, or other circumstances leading to local changes in the intestinal wall. (J.M. Stormont, et al., Ann. Int. Med, July 1959)

Risks of Aminophylline. Aminophylline intoxication is difficult to recognize. The drug has produced at least 14 deaths and 53 cases of serious toxicity in children. The most serious problem is overdosage. Caution is urged in the intravenous use of the drug in patients with limited cardiac function and in children who show a marked sensitivity to the drug's central nervous system stimulant effect. (E. B. Truitt, GP, August 1959)

Test of Pituitary Reserve. SU-4885 inhibits 11\$\beta\$-hydroxylation of steroids by the human adrenal cortex and leads to a decrease in cortisol secretion, a "compensatory" rise in ACTH secretion, and secretion of large quantities of 11-desoxycorticosteroids such as compound S. In normal subjects this substance induces a rise in total blood and urinary 17-hydroxycorticoids and provides a sensitive means of testing the reserve capacity of the pituitary gland to secrete ACTH. (G. W. Liddle, et al., J. Clin. Endocrinol., August 1959)

Antibiotics and Anesthesia. Antibiotic administration during surgery may be associated with hazards not normally encountered in unanesthetized subjects. The potential dangers are not those usually associated with prolonged repeated administration of these drugs such as allergic responses and blood dyscrasias but rather acute states of respiratory or circulatory depression. (C. B. Pittinger and J. P. Long, A. M. A. Arch. Surg., August 1959)

Strokes. A pamphlet prepared by the American Heart Association, "Strokes, a Guide for the Family," is available as a guide for those concerned with the rehabilitation of the stroke patient in the home. This booklet, available to physicians and therapists in quantity for distribution to the families of stroke patients, may be obtained from local heart associations or by writing to American Heart Association, 44 East 23rd Street, New York City.



Tranquilizing Drugs in Oral Surgery

The use of promazine and meprobamate to control postoperative sequelae in oral surgery was clinically evaluated in 150 military patients. When the results of ataractic drug therapy were compared to those of placebo, no significant effect was noted on the postoperative sequelae of pain, swelling, or trismus. Tranquilizing drug therapy failed to influence the postsurgical narcotic demand. The incidence of untoward reactions was not significantly increased. The number of days lost during postsurgical convalescence was increased significantly for patients on promazine and meprobamate therapy. On the basis of these findings, the use of promazine or meprobamate cannot be recommended for the control of postoperative sequelae in oral surgery. (L. Smyd, C. M. McCall, E. T. Enright, Tranquilizing Drugs in Oral Surgery, Rep., School of Aviation Medicine, Randolph AFB: Technical Abstract Bulletin No. U59-9, (ASTIA) 1 May 1959)

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Navy Exhibits at Centennial Session of A. D. A.

Two Navy Dental Exhibits will be shown at the Centennial Session of the American Dental Association in New York from September 14 to 18, 1959. The first exhibit is the U.S. Navy Dental Corps' "Casualty Treatment Training Program II. " This exhibit illustrates various phases of the casualty treatment program for Naval Dental officers. Some of the training aids developed by the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Md., to develop skill and dexterity in treating casualties are features. An outstanding feature is a model of a military casualty fitted with special types of moulages simulating different injuries. The viewer is challenged to decide how he would handle the injuries. A demonstration of the accepted emergency treatment for each of the simulated injuries is made at intervals during display of the exhibit. Additional emphasis on accepted emergency treatment is created by illuminated still photographs and by use of an automatic slide projector. The aim of the exhibit is to create in Naval and civilian dentists an interest in participation with Civil Defense authorities at the professional level as demonstrated in the exhibit.

The second exhibit is "First Line Dentistry for the First Line of Defense." This exhibit is designed to depict a wide variety of professional subjects. The topics are illustrated by color transparencies, art presentations, and training aids. The monitor chooses a subject by illuminating a sliding panel, one for each subject, and illustrates and supplements his talk with training aids.

The monitors for the "Casualty Treatment Exhibit" will be CDR J.D. Shaw and CAPT H.J. Towie DC USN; for "First Line Dentistry, monitors will be CAPT G.W. Ferguson and CAPT J.B. Ferris DC USN.

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Anniversary Greetings from Commandant of Marine Corps

General R. McC. Pate, Commandant of the Marine Corps, on 21 August 1959, addressed the following letter to Rear Admiral C. W. Schantz, Assistant Chief for Dentistry, and Chief, Dental Division, Bureau of Medicine and Surgery:

"I with to extend to you the heartiest congratulations of the Marine Corps on this 47th Anniversary of the Navy Dental Corps.

"The readiness of our combat forces depends not only upon training and equipment, but also upon the physical fitness of the individual Marine as well. The Marine Corps appreciates the effort expended by the officers and men of your Corps toward accomplishing this task.

"Again, congratulations for the achievements of the past year and best wishes for the next."

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Philippine Armed Forces Dental Service Anniversary

The Dental Service of the Philippine Armed Forces recently celebrated its Fifth Anniversary in Manila, Philippine Islands, with a two-day program of events. The first day was devoted to scientific sessions and the second to social affairs.

Among the essayists of the first session was Captain A. K. Kaires, DC USN, Senior Dental Officer, U.S. Naval Station, Sangley Point who presented a paper on "Occlusal Equilibration."

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Navy Dental Corps' Continuous Training Program

A short course in Oral Surgery will be conducted at the U.S. Naval Dental School, National Naval Medical Center, Bethesda, Md., September 21 - 25, 1959.

The course will consist of seminars, lectures, and demonstrations. It is intended to cover treatment of facial fractures and other oral surgical procedures, local and general anesthesia, premedication, principles of exodontia, and biopsy techniques. Emphasis will be placed on preoperative evaluation and minimal postoperative complications.

The instructor is CAPT D. E. Cooksey DC USN, Diplomate, American Board of Oral Surgery.

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Scientific Session of Federation Dentaire Internationale

Reserve officers will be credited with one retirement point for attending the scientific session of the 47th Annual Session of the Federation Dentaire Internationale Meeting at the U.S. Military Academy, West Point, N.Y., on 11 September 1959. Officers planning to attend must arrive at the Military Academy Main Gate, prior to 1:00 p.m., via their own transportation. They will be met there by a Naval representative who will escort them in a body to Thayer Academic Hall for the scientific sessions.

These sessions will commence at 1:15 p.m., and after a discussion period will adjourn at 3:45 p.m. The program will include:

- 1. The Role of the Royal Naval Dental Service

 Surgeon Rear Admiral (D) Charles J. Finnigan
 L.D.S., Q.H.D.S., Deputy Director General for
 Dental Services, Royal Navy, Great Britain
- 2. Medical Management of Mass Casualties

 Colonel Thomas A. McFall DC USA, Director

 Division of Dentistry, Walter Reed Army Institute
 of Research, Walter Reed Army Medical Center
- 3. Aerodontalgia

 Colonel Harold E. Kelley (DC) USAF, Deputy for Preventive Dentistry and Research Office of the Assistant for Dental Services

4. Submarine Medicine and Cold Weather Dentistry
Captain William R. Stanmeyer DC USN, Head,
Professional Branch, Dental Division

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BUMED INSTRUCTION 6700.5B

11 August 1959

From: Chief, Bureau of Medicine and Surgery

To: Distribution List

Subj: Medical and Dental Spaces in Vessels of Reserve Fleets

Ref: (a) Ship Activation Manual (NavPers 10006), Chapter 22

Encl: (1) Procedures for Inactivation of Medical and Dental Spaces
Aboard Ships Entering the Reserve Fleets

This instruction announces procedures for activation and inactivation of medical and dental spaces in vessels of Reserve Fleets.

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RESERVE



SECTION

Change in Active Duty Policy for Enlistees

Young men between the ages of 17 and 26 who are not high school students now may enlist in the Naval Reserve for participation in a drilling unit or for immediate performance of 2 years' active duty. Formerly, men between the ages of 18-1/2 and 26 could enlist in the Naval Reserve only for immediate active duty.

The change in policy will enable this older age group to affiliate with a drilling unit and complete basic training before being ordered to full-time active duty.

Those enlisting for drill participation will be required to perform the first 14-day period of active duty for training within 120 days of enlistment. Orders to full-time active duty will be delayed until advancement to pay grade E-2. Normally, the delay in receiving active duty orders will not exceed 12 months; however, additional delay may be granted to Reservists who may be able to complete an accelerated training program.

Reservists failing to continue satisfactory participation in unit drills will be subject to orders to immediate active duty.

The policy for high school students between the ages of 17 and 18-1/2 enlisting in the Naval Reserve remains unchanged.

Additional information may be found in a revision of BuPers Instruction 1130.5 which will be published soon. (The Naval Reservist, August 1959)

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Reserve Hospital Corps Division Activated

The Naval Reserve Hospital Corps Division 5-1 was activated and established recently at the National Naval Medical Center, Bethesda, Md. This paid drilling unit of the active fleet augmentation components of the Selected Reserve Forces conducts multiple drills on the second weekend of each month. Training commences at 0800 on Saturday and ends on the following Sunday at 1630. Thus, four drills are conducted on a weekend and no other drills are scheduled during the same calendar month. The unit consists of 5 officers and 50 enlisted hospital corpsmen, the latter receive instruction and training enabling them to qualify for advancement in rating. CDR J. W. Walsh MC USNR is the Commanding Officer; LCDR P. Bayer USNR is Executive Officer.

Interested eligible Naval Reservists may obtain information regarding affiliation with this Division by writing CDR Walsh at the U.S. Naval and Marine Corps Reserve Training Center, Silver Spring, Md.

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Tables of Organization for Naval Reserve, Fiscal Year 1960 BuPers Instruction 5400. 1H, 1 July 1959 General Provisions

- 1. General Information. The Chief of Naval Operations has established Selected Reserve Forces within the Naval Reserve and has allocated ceilings for each drill pay program of the Naval Reserve for fiscal year 1960, determined on the basis of mobilization requirements. The Tables of Organization for Naval Reserve, Fiscal Year 1960, includes the drill pay programs in the Selected Reserve under five basic components:
 - a. Antisubmarine Warfare
- c. Active Fleet Augmentation

b. Mine Warfare *

- d. Fleet Support Activities
- e. Shore Establishment
- * Under development for implementation

The authorized number of units included in the Tables of Organization exceed the allocated ceiling sufficiently to insure that actual on-board numbers are sufficient to meet mobilization requirements. The Tables of Organization numbers will be reduced on an annual basis to more realistically match mobilization requirements. The Chief of Naval Personnel administratively controls these numbers as necessary to preclude exceeding the drill pay ceiling.

2. Drills

a. Number

(1) Naval Reservists assigned in pay status to units of the Selected Reserve Programs listed below may be paid for attendance at a maximum of 24 or 48 drills as appropriate for the table indicated. Drills may be scheduled in such numbers as necessary to insure that members have an opportunity to attend the maximum number of paid drills authorized.

Paid Drills	Table				
48	1-12,	14,	17	-19,	21-23,
24	13		15,	16,	20

(2) Pay is not authorized for units of the Specialist Programs except that certain members of these programs in Ready Reserve status may receive pay for the faithful performance of duties in connection with the administration and training of their units. This matter is discussed in paragraph 7.

b. Frequency

(1) Selected Reserve Programs. Within the annual maximums shown above, paid drills may not be credited to an individual in excess of the rates listed below, except that members of units authorized 24 paid drills annually may be paid for attendance at a maximum of three paid drills during a calendar month in those cases where attendance at a scheduled equivalent drill would exceed the maximum of two:

Max. Auth.	Max. Auth.	Max. Auth.	Max. Auth.	Max. Auth.
Annually	Per Quarter	Per Month	Per Week	Per Day
48	13	6	3	2
24	6	2	2	2

(2) Specialists Programs. All Specialist Programs except the NROS Program are authorized to schedule 24 drills annually. If the unit commanding officer desires to afford members of his unit more training than that offered through the regular curriculum or more training by expanding the regular curriculum, or if the unit desires to undertake a special project or study, which is in consonance with the specialty of the program concerned, an additional 12 or 24 drills may be scheduled with the approval of the Commandant. Drills may not be credited to an individual in excess of the rates listed below:

Max. Auth.	Max. Auth	Max. Auth.	Max. Auth.	Max. Auth.
Annually	Per Quarter	Per Month	Per Week	Per Day
48	13	6	3	2
36	10	4	2	2
24	8	3	2	2

- (a) The maximums established above for twenty-four drills annually are also applicable for those members authorized to receive pay.
 - c. Type
- (1) Regular drills are described in detail in the BuPers Manual.

 A regular drill is a period of not less than 2 hours and is the only drill conducted in any one calendar day.
- (2) When two or more drills are conducted in any one calendar day, they shall be considered as multiple drills and each drill shall be of at least 4 hours duration. Multiple drills are authorized for all Selected Reserve Programs of the Naval Reserve.
- (3) Drills may be scheduled in increments in accordance with the BuPers Manual.
- 3. Active Duty for Training. An individual must be a member of the Ready Reserve to be eligible for active duty for training with pay. Further, the following conditions apply:
 - a. With Pay
- (1) Required. Annual active duty for training with pay, normally for a period of fourteen (14) days, is authorized within the limits of funds available for personnel assigned to units of programs listed in Tables 1 through 23, 27, and 28.
- (2) Authorized. Annual active duty for training with pay, normally for a period of fourteen (14) days, is authorized within the limits of funds available for personnel assigned to units of programs included in Tables 24 and 25, and for personnel under appropriate duty orders in accordance with Table 26. Within the provisions of other current, applicable directives, a period of twenty-eight (28) days annual active duty for training with pay is authorized, within budgetary limitations, for members of the Naval Reserve assigned to Naval District Active Status Pools in Training Category H.
- b. Without Pay. Active duty for training without pay, normally a period of fourteen (14) days, is authorized within the limits of funds available for transportation and subsistence allowances, for the following members of the Naval Reserve:
 - (1) Those who are not eligible for active duty for training with pay.
- (2) Those who have been unable to take active duty for training with pay for lack of funds.
- (3) Those who are granted periods of active duty for training in excess of fourteen (14) days (exclusive of travel time).
- c. Special Active Duty for Training. Special active duty for training, with or without pay, for periods in excess of fourteen (14) days but not more than ninety (90) days duration including travel time, may be performed for special purposes by Naval Reservists upon approval of the Chief of Naval Personnel. Requests for active duty for training in excess of fourteen (14) days must be fully justified and favorably recommended by cognizant commands.

d. Group Active Duty for Training. Group active duty for training shall be authorized and conducted in accordance with the instructions contained in Article H-4204 of the BuPers Manual.

NOTE: Additional excerpts from this important Instruction will be published in succeeding issues of the Medical News Letter.

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PREVENTIVE MEDICINE

Respiratory Virus Diseases

Hardly a month goes by without the discovery of a new virus affecting the respiratory tract. Apart from the influenza virus which caused a worldwide epidemic, there are many such viruses which are more easily distinguished from one another by serological tests than by the clinical syndromes which they cause. They are responsible not only for acute feverish catarrh of the respiratory tract, but also for eye lesions and intestinal troubles. The differential clinical diagnosis of these virus diseases whose causal agents can be isolated from the feces and throat washings is still far from precise. A clear-cut etiological relationship between any one of the viruses concerned and a given respiratory syndrome has been established in only a few cases, so that the situation is well described by the phrase "viruses in search of a disease. " These viruses are responsible for more or less severe epidemics affecting groups of children or adults-particularly members of the Armed Forces-in various parts of the world. Usually benign, such infections, nevertheless, may prove fatal to children or persons whose resistance is low. They are a cause of morbidity and absenteeism and, as such, are important from the standpoint of public health.

The discovery of these viruses in increasing numbers, their wide distribution, and the continuing ignorance of their biological properties, degree of variability, and stages in their growth cycle, have aroused the interest of microbiologists and extended the field of research on respiratory virus diseases previously concentrated on influenza. This development is reflected in the fact that the WHO Expert Committee on Influenza has now been replaced by an Expert Committee on Respiratory Virus Diseases. The following review is made of the first report of this Committee.

Influenza During 1957 - 1958

Influenza headed the diseases discussed by the experts. The pandemic added greatly to knowledge of the disease and showed the strengths and weaknesses of the world network of epidemiological information and specialized laboratories coordinated by WHO. The epidemiological and clinical characteristics of the pandemic and probable existence of an animal reservoir were discussed by the Committee. (A review of these studies was published in WHO Chronicle, 13: 163-168, April 1959.)

Antigenic changes occurring in influenza viruses since 1933 (the year when the first of these viruses was isolated) have been generally minor, except in 1946 - 1947 when the Al virus first appeared, and in 1957 when the A2 virus—differing more sharply from viruses isolated during previous epidemics than the latter viruses differed among themselves-appeared in the Far East. In all probability, this virus will remain the dominant type in coming years. The mechanism of antigenic variation, so evident in the type-A viruses and less appreciable in the group-B viruses, seems to be based on a natural liability coupled with the forces of selection tending to insure survival of the virus. It is as though the virus, on encountering an environment which is partially immune following previous epidemics, brings into play hitherto latent potentialities which enable it to survive for a certain period. Thus, the A, Al, and A2 types have succeeded one another during the last 25 years. All have a soluble, group-specific antigen in common, but have different virus antigens as shown by the hemagglutination test. These differences are sometimes such that the antibody produced as a response to one virus affords hardly any protection against the others as in the case of the Al and A2 viruses.

The variability of the influenza viruses complicates the problem of vaccination. It might be thought that the inclusion of the largest possible number of antigens in the vaccine would insure reasonably reliable protection. However, the forces of selection seem to thwart these theoretical precautions and the appearance of previously unknown antigens renders them ineffective.

The role of the World Health Organization Influenza Center is, in part, to follow up closely, all over the world, antigenic evolution of influenza viruses which remains a major epidemiological mystery.

Experiments in a number of countries show that vaccination reduces the incidence of influenza by two-thirds. To be effective, it should be carried out at least 2 weeks before the disease becomes epidemic. The vaccine will naturally contain the virus causing the epidemic which, at present, would be the A2 virus. It has also been considered advisable to include an A1 strain, for this virus still may be responsible for certain cases. Some researchers have suggested broadening the composition of the vaccine still further by including an A strain, a swine influenza strain, a B strain isolated after 1953, and even a Lee 1940 strain. In the light of experience of the last 40 years, the antigenic makeup of influenza virus changes to a notable extent only every 10 or 15 years. Thus, it is probable that vaccines prepared with known strains will confer satisfactory protection during the next few years.

There can be no question of vaccinating the whole population. The cost would be disproportionate to its practical value. It is clear that certain groups will have priority—those occupying key positions in the general and social services and in branches of industry where mass absenteeism would have serious economic repercussions. In the event of serious epidemics, age groups most threatened also should be vaccinated.

Vaccination is recommended for expectant mothers and for children and adults suffering from diabetes and cardiovascular, renal, or pulmonary diseases. During the 1957 pandemic, pneumonia was caused by the influenza virus mainly among persons suffering from chronic pulmonary congestion following a cardiac complaint, or those in an advanced state of pregnancy. Despite its evident pneumotropism, the 1957/1958 virus was relatively mild and caused only a low mortality. Nonetheless, it is true that primary pneumonia caused by influenza virus is of major importance and should be anticipated and studied. Cases should be reported immediately to national influenza centers.

During the last 10 years, a live influenza vaccine has been administered in the USSR with—its advocates report—results as satisfactory as those given by the formaldehyde-inactivated vaccine used elsewhere. Researchers in the USSR have also advocated serotherapy by the intranasal route using hyperimmune horse serum.

No specific treatment for influenza has been discovered in recent years. The Committee mentioned the serious drawbacks which may accompany indiscriminate use of antibiotics. Although the latter can save lives in cases of bacterial complications—and even in these cases the antibiotics should be selected after identification of the responsible microorganisms—they are not indicated in cases of uncomplicated influenza occurring in persons normally in good health. The dangers of antibiotic resistance which may result from such injudicious treatment must not be minimized.

WHO Influenza Program: Successes and Possibilities for Improvement

The abundance of data brought together and discussed by the Committee is proof of the value of epidemiological services and the network of national influenza laboratories operating in liaison with the WHO-sponsored World Influenza Center for the Americas. Despite this, the Committee did not conceal the shortcomings observed during the recent epidemic. In certain countries the dispatch of epidemiological information and virus strains was delayed unduly and sometimes neglected despite realization that the epidemic was spreading on a large scale and that the new virus was responsible. National centers for the study of influenza had not been officially designated in all countries, not because of any lack of laboratories capable of carrying out necessary work of isolation and identification, but owing to lack of organization. Thus, there were regrettable gaps in the network of information and of laboratories in relation with WHO which, to be effective, must be worldwide.

The epidemic had already been raging for several weeks before it was reported. This was because it commenced in areas of Asia which do not participate in WHO programs and do not collaborate with epidemiological information services. Two months were lost during which arrangements could have been made to combat the epidemic more effectively than was actually found possible. Although it is impossible to foresee the origin of an epidemic or what will be its extent and severity, public health measures—if taken in time—can, nevertheless, limit its effects.

Other Respiratory Viruses

The discovery in 1953, in an adenoid culture, of certain cytologic changes caused by a virus until then unknown, opened a new chapter in human virology.

This and other viruses of the same family were named "adenoviruses" after the tissue in which the original virus was found. Since their discovery at least 18 serologic types have been isolated. They are found in the respiratory tract from the nose to the lungs, and sometimes on the eye or in the intestines. They cause cellular changes in those parts of the organism leading to inflammation and hypertrophy of the corresponding lymphatic tissues. Fever, pharyngitis, and coughing are the main symptoms to which may occasionally be added coryza, lymphadenopathy, headache, and myalgia. Some of these viruses also cause follicular conjunctivitis and epidemic keratoconjunctivitis. Spread is favored by communal life. They are often found among members of the Armed Forces in the United States and the United Kingdom, more often in winter than in summer. They are more uncommon among the civil population, but epidemics sometimes arise in child communities. Spread is not through air only, but there may be excretion in stools over long periods and transmissions as enteric viruses. Occasionally, transmission has been by water in swimming pools and lakes.

These viruses form a group with a common soluble antigen. However, they can be distinguished from one another by antigenic factors which can be differentiated by serologic tests. They have been given the serial numbers 1, 2, 3, 4, et cetera. Some types are found more frequently among children, others predominate in military camps.

These viruses grow well only in tissue cultures of human cells, either normal or malignant (HeLa, KB for example). Animal tissues are generally unsuitable for their culture, although adaptation of certain adenovirus types of monkey kidney cell culture has been accomplished with difficulty. A considerable time may elapse before recovery of the virus is achieved since adenoviruses apparently go through a long growth cycle before their presence is revealed by cytopathic changes in the cultures. The report includes technical details on isolation of these viruses as well as on serologic diagnosis by complement-fixation and neutralization tests.

Bivalent or trivalent vaccines containing two or three types of adenovirus have been prepared on monkey-kidney cells and treated with formaldehyde. When administered intramuscularly to members of the Armed Forces—particularly liable to infection by adenoviruses—the vaccines led to a decrease of 55 to 81% in the incidence of acute respiratory illnesses as a whole and of 90% in that of diseases caused specifically by adenoviruses. Vaccination is, therefore, indicated in barracks and military camps. In 1957 the Federal Register of the United States published information on the commercial manufacture of adenovirus vaccine.

A certain number of viruses have been isolated which cause atypical pneumonia and, among children in particular, illnesses sometimes reminiscent of influenza. Examples of such viruses are the Sendai virus of Japan, the CA virus (associated with croup), and the hemadsorption viruses HA1 and 2. (Since the meeting of the Committee, the Virus Subcommittee of the International Nomenclature Committee has suggested the inclusion of these viruses in a myxovirus para-influenzae group, of which they would be types 1, 2, and 3; the HA2 virus being attached to type 1. The use of the term "influenza D" for Sendai virus should be abandoned.)

None of the numerous viruses isolated in recent years can be reasonably regarded as the cause of the common cold which remains one of the most baffling problems in human virology.

The report concludes with a series of technical annexes which deal with methods for the preparation of sera, typing of influenza strains, techniques for influenza diagnosis, and the use of complement-fixation in the typing of the influenza virus. (WHO Chronicle, 13: 261-264, June 1959)

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Penicillin Resistance in Gonococci

At the end of 1956 it was noticed that a small proportion of male patients of the Whitechapel Clinic, The London Hospital, with uncomplicated gonococcal urethritis were failing to respond to routine treatment of 300,000 units procaine penicillin given intramuscularly, and continued to show gonococci in their discharges. As reinfection seemed an unlikely explanation, a comparison of in vitro sensitivity of gonococci to penicillin with results of treatment was undertaken.

Strains of gonococci isolated from patients—mostly male—attending the clinic during April - December 1957 were examined for sensitivity to penicillin, using the tube technique. Particular attempts were made to isolate strains from treatment failures. Analysis of penicillin sensitivity of 302 strains of gonococci isolated from patients before any treatment was given revealed that 19.5% were sensitive to a minimal inhibitory concentration of penicillin of 0.125 to 0.5 unit/ml. This appreciable proportion of relatively

resistant strains is in contrast to the findings reported by others between 1945 and 1954, indicating that gonococcal strains are rarely found to be resistant to penicillin in concentrations greater than 0.06 units/ml. The proportion of relatively resistant strains isolated in November and December 1957 had increased significantly over that of strains isolated during April and May 1957. Three of 83 strains of gonococcitested were resistant to streptomycin at a concentration greater than 1000 mcg./ml. One of these strains was also relatively resistant to penicillin.

Clinical investigation of the results of treating male acute gonococcal urethritis with penicillin began in November 1956 and continued through December 1957. From a group of 1116 cases treated with an intramuscular injection of 300,000 units of penicillin in oil with 2% aluminum monostearate (PAM), or aqueous procaine penicillin, gonococci were found in 124 after treatment. Sensitivities to penicillin were determined for gonococci isolated from 251 patients of whom 29 showed post-treatment gonorrhea in the first week. Only one of these 29 treatment failure cases gave a history of re-exposure. Again, an appreciable proportion (20%) of the 251 strains were resistant to penicillin at concentrations below 0.125 units/ml. Of interest is the observation that 21 (72%) of 29 treatment failures were infected with gonococci resistant to concentrations of penicillin lower than 0.25 units/ml. It should be noted that only 50 to 60% of the 251 patients were observed for one week or more.

Patients who were observed with post-treatment gonorrhea gave one of the following histories:

- (1) The initial symptoms disappeared within 24 hours of treatment and then recurred and persisted after a symptom-free period of one to 2 days.
- (2) The symptoms lessened after treatment, but after a day or two, increased in severity up to the pretreatment intensity.
- (3) The symptoms remained unchanged or even increased after treatment.
- (4) Occasionally, patients with post-treatment gonorrhea were symptomless, but a purulent urethral discharge with pyuria was found on examination. This apparently asymptomatic carrier state should be borne in mind during the management of gonorrhea, and all patients should be carefully examined by stripping the urethra and staining the secretion even though most patients may assert that they have recovered. Retreatment of these patients consisted of another injection of 300,000 units of penicillin. Most of them were still unimproved and were then treated with 600,000 units of penicillin. Again, many of these cases remained unchanged and were finally cured by a single intramuscular injection of 1 or 2 gm. of streptomycin.

Work on penicillin sensitivity of gonococci done in 1946 and 1947 indicated that the level of penicillin in blood and tissues required to inhibit or kill gonococci was 0.03 to 0.06 units/ml. This became the standard to which penicillin preparations were designed to conform. The authors found that blood levels adequate to kill gonococci whose resistance to penicillin

in vitro extended to 0.5 unit/ml. were seldom reached long enough to insure good therapeutic results following an injection of 300,000 units of aqueous procaine penicillin or PAM. Examination of blood levels following larger doses of penicillin indicated that successful therapeutic results in infections with more resistant strains of gonococci can be expected. It was found that 600,000 units of benzathine penicillin alone, however, gave worse results than 600,000 units of either PAM or aqueous procaine penicillin. Moreover, there may be a real danger that, in using benzathine penicillin with its prolonged duration in blood and tissues, some patients with gonorrhea may be converted into living test tubes for producing resistant strains of gonococci. It seems that intramuscular injection of 600,000 to 1,200,000 units of aqueous procaine penicillin with or without a "booster" dose of crystalline G is likely to give best results without undue prolongation of useless and perhaps dangerous levels of penicillin in blood and tissues. It is suggested that efforts be made to devise a penicillin preparation which would give a blood level of not less than 1.0 unit/ml. for not less than 24 hours, and preferably for not much longer. (Curtis, F.R., Wilkinson, A.E., A Comparison of the InVitro Sensitivity of Gonococci to Penicillin with the Results of Treatment: Brit. J. Ven. Dis., 34: 70-82, June 1958)

NOTE: Clinical evidence of increasing resistance of the gonococcus to penicillin was found in a study conducted in 1958 in Korea. (CAPT E. Epstein (MC) USAR, Failure of Penicillin in Treatment of Acute Gonorrhea in American Troops in Korea: J.A.M.A., 169: 1055-1059, March 7, 1959)

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Essentials of Food Establishment Sanitation

In the first article of this series (Medical News Letter, 3 July 1959), the ir portance of health, health habits, and physical condition of people in the food service industry was stressed. Even with present day mechanization, the human element in food business is still the number one factor.

Food Wholesomeness

Next to people, and practically inseparable in any list of essential elements, is food itself. Almost universally, food ordinances stress food safety and wholesomeness. However, the question might be raised, "Is too much being taken for granted in this phase of the food control program?" Although the sanitary quality of food has shown and continues to show marked improvement, the sanitarian in his rounds of inspection must be ever alert to conditions and circumstances which may endanger food wholesomeness.

Wholesomeness, as it applies to food, is somewhat difficult to define because of the number of points to be considered. Generally, the broad

meaning of wholesomeness of food denotes products for human consumption that have attributes of purity, safety, and acceptability. Conversely, unwholesomeness is easier to define. Here, a long list of detailing conditions can be given which directly or indirectly influence food wholesomeness. For purposes of this article, wholesomeness will be considered to mean a pure, safe, and acceptable product.

Conditions Affecting Food Wholesomeness

When food ordinances are viewed as a whole, it is readily seen that nearly every provision basically points to protection of food wholesomeness. Therefore, the sanitarian must constantly be concerned with a variety of conditions which directly affect wholesomeness. Some of the more prominent circumstances, classified arbitrarily, are:

- 1. People and Infectious Materials. Pathogenic organisms may be introduced as a result of transmissible illness and carrier state among workers.
- 2. Water. Food or food containers exposed to, or washed in, unsafe water.
- 3. Sewage and Plumbing.
 - a. Drip from leaking overhead sewer or waste lines
 - Contamination of food and food containers by sewage back flow
 - c. Back siphonage into potable water
 - d. Flooding of food storage areas
- 4. Insects. The house fly and cockroach, when allowed access to food, may introduce pathogenic microorganisms.
- 5. Rodents. Rats and mice may introduce both extraneous contaminants: i.e., hair, urine, feces, and pathogenic microorganisms.
 6. Storage.
- a. Failure to provide protected storage permitting introduction of foreign materials or harmful microorganisms.
- b. Failure to use cold storage properly, thus allowing undesirable change to take place in food. Both enzymatic and bacterial changes will result.
- 7. Chemicals. Chemicals may be added in a variety of ways, i.e., intentionally or accidentally. They may be in the form of preservatives or additives, soluble linings or coating on food contact surfaces or through improper use of disinfectants, insecticides, and rodenticides.
- 8. Food Contact Surfaces. Surfaces upon which food is prepared or processed and contact surfaces of containers and utensils that have not been subjected to effective bactericidal treatment may contribute to food unwholesomeness.
- 9. Improper Cooking. Aside from a number of infectious bacteria,

parasites and helminths also may remain viable if cooking is not complete. Trichinosis from insufficiently cooked pork, and botulism, which may result from ingestion of improperly processed canned food, are classic examples.

10. Food Inherently Poisonous. These include mussels and clams in certain seasons, poisonous mushrooms, flesh of certain fish, and ergotism from parasitic fungus of rye grain. Food allergies also may be mentioned as a factor.

Checking for Signs of Unwholesomeness

The ten foregoing items point to the need for diligence in the inspection of food served to the public. Existence of any one or a combination of the elements listed can constitute the cause of illness. Sufficient epidemiological studies of foodborne outbreaks have been made to confirm that, somewhere along the line, some safeguard has been neglected and food has become unwholesome.

Aside from the usual environmental survey of the food establishment, made routinely by public health and other personnel, there are other signs and criteria which the sanitarian can use to evaluate food wholesomeness. Some of these criteria will be given for specific foods. They mainly apply to organoleptic appraisal and are useful in making on-the-spot decisions either to condemn food as definitely unwholesome or to order it withheld from sale until more exacting laboratory determinations can be made.

Some Signs of Unwholesomeness

Fresh Meat

1. Beef

- a. Slime is the result of bacterial growth and is evidence of lack of proper temperature and moisture control in the refrigerator. Slime is usually noticed first on those parts where circulation of air is most restricted—underneath skirt and hanging tenderloin and on the inside of the flank. Slime is evidenced by moist, sticky surfaces accompanied by a distinct odor which in advanced cases may become offensive. If this condition is found to be extensive, beef should be rejected because it indicates faulty handling. The seriousness of surface slime lies in the fact that internal deterioration may have taken place.
- b. Evidence of Contamination. If beef quarters or other wholesale cuts are found to be soiled and dirty there is indication of carelessness during transportation and delivery. This calls for investigation of handling methods used by the packer or wholesaler. Beef, either fresh or frozen, never should be piled on a dirty floor. Beef that becomes wet or contaminated with dirt spoils more readily than dry clean beef. Cleanliness of the beef carcass is highly important. Trucks used for transporting fresh meat should be scrupulously clean, and the floors should be covered with clean paper or canvas. All trucks should be covered. For

long hauls refrigerated trucks are used, but for local delivery, generally they are not. In hot weather, even for local delivery, refrigerated trucks should be used because of the high perishability of the product.

c. Detection of Sulphite. Sodium sulphite is sometimes illegally added to hamburger to conceal inferiority and give meat a fresh red appearance. Such adulteration can be detected through the use of malachite green. Ten drops of a 0.20% aqueous solution of malachite green is added to one-half teaspoonful of meat. Meat containing sulphite will decolorize the dye quickly. This is a useful field test for detection of added sulphite.

2. Fresh Fish

Signs of Spoilage. Fresh fish is very perishable. The condition of fresh raw fish can be judged by noting certain points. The gills should be pink to dark red in color and firm. As decomposition takes place the gills become slimy and gray or grayish green. In stale fish, the eyes become dull and sunken. When decomposed blood cells diffuse into the flesh, a reddish color around the backbone is noted. A stale fish laid across the hand is less rigid than a fresh one. In stale fish the flesh will pit on pressure because resiliency has been lost.

Oysters

Signs of Spoilage. Aside from organoleptic testing, a pH reading on oysters or oyster liquor will assist in establishing wholesomeness. The pH of fresh shucked oysters varies between 6.0 and 7.0. A pH value of 5.4 to 5.8 is regarded with suspicion. Values below this range are indications of decomposition. Convenient field examination can be made of the liquor by adding methyl red indicator solution. This indicator has a range of pH 5.4 to 6.0.

4. Poultry

Signs of Spoilage. Dressed poultry decomposition can be detected by a stickiness under the wings, under the thighs, at the top of the wings, and around the apron. There is a sebaceous gland at the latter portion that is often cut out by the dresser because of its quick spoilage detecting property. Chilled chickens, both drawn and undrawn, have limited keeping qualities. In undrawn birds, the contents of the digestive tract are likely to ferment unless temperatures close to freezing are maintained.

5. Other Foods

- a. Stored cereals should be examined for possible insect infestation, rodent contamination, discoloration of sacks indicative of overhead leakage, and moldiness.
- b. Canned foods should be examined for leakers, springers, or swells. A leaker is a can not hermetically sealed and which allows air to enter and the product to exude. Leaks are qualified by section of can affected such as crimp, seam, end, or body. Springers are filled cans with ends which are bulged. This may be from over filling, insufficient exhausting, production of hydrogen or carbon dioxide gas through bacterial

action, or action of acid content on the metal can. When one end is pressed in with the hand or fingers, the opposite end will bulge out. Products in such cans are not safe for consumption and should be rejected. Swells are bulged out filled cans with both ends remaining taut as distinguished from the springer. Swells are caused by much the same condition as springers. The swell may also be due to pin point leaks which allow entrance of micro-organisms. Swells should be rejected.

Exercise of Powers of Observation

This article does not list all of the many defects which may occur in food. However, the examples which are given indicate that the sanitarian should look at food with a trained eye. Observation of processing, transportation, preparation, and storage may reveal faults which lead to some of the conditions described in the foregoing. Most food defects indicate faulty handling or a failure to employ satisfactory techniques. Persons working regularly with foods should cultivate an inquisitive attitude toward food wholesomeness. This is essential to the proper enforcement of a provision which is common to most food ordinances; namely, "All food and drink shall be wholesome, free of spoilage, adulteration, misbranding, and contamination and shall be safe for human consumption. It shall be prepared and served in a sanitary manner under sanitary conditions." Essentially, this provision constitutes one of the basic principles for effective food control. Other specific details establishing environmental factors stem from it and are closely allied with it. (Special Service Article-Some Essentials of Food Establishment Sanitation: J. Milk and Food Technology, 22: 82-84, March 1959)

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Salmonella Blockley Outbreak

Two cases of suspected paratyphoid fever were reported from a Long Beach naval facility. After questioning these patients, the Medical Officers were led to believe that a food infection was involved and that the suspect food had been served at a wedding reception. This fact was immediately reported to the health department. Had this not been done it is quite likely that this particular food infection episode would never have been known as such. The sailors were unable to recall where the wedding reception had been held, but they stated that information about the reception could be obtained from persons frequenting a certain bar in the city of Los Angeles.

Surprisingly enough, when the bar was contacted it was found that persons who attended the wedding reception were known as frequent patrons and that it would be possible to reach them at that address. Through the cooperation of the Los Angeles City Health Department an inspector visited

the bar and was able to obtain a list of 70 names and addresses of guests at the reception. Victims were found to reside not only in the Los Angeles County Health Department area but also in Long Beach, Los Angeles City, and Hanford in Kings County. Subsequent investigations indicated that 31 of the 70 persons were ill following the reception. Salmonellae were isolated from 10 of the specimens submitted by the 31 victims. The salmonella organism was subsequently identified as Salmonella blockley in the laboratory of the State Department of Public Health.

This was a new species of salmonella in Los Angeles County. Information furnished by the State Department of Public Health showed that Salmonella blockley was isolated in California once in 1957 and 3 times in 1958. It was first identified in 1954 in eastern United States where outbreaks involving several thousand persons were traced to chicken.

Since I January 1959, California has experienced two outbreaks involving Salmonella blockley—one in the San Francisco Bay area and the other, described above, in Los Angeles county. The Bay area outbreak involved seven different dinner parties at one restaurant on New Year's Eve. Shrimp cocktail or chicken was the suspected food. Chicken appears to be definitely involved in the Los Angeles outbreak as there were victims in two households who did not attend the wedding reception but ate chicken which was brought from the reception. The method of preparation and handling of the chicken prior to and during the wedding reception was such as to be conducive to maintenance and spread of the infectious agent in the food. (Carson, C. C., Introducing Salmonella Blockley, One of Los Angeles County's Newcomers: Los Angeles County Health Index, 20 June 1959)

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Calcium Hypochlorite

An unusual incident was reported in the Preventive Medicine Report of an Air Force base. In the process of adding calcium hypochlorite to the automatic chlorinator at the swimming pool, a paper cup was used as the container for the chemical rather than the hard rubber or plastic cup normally employed for this purpose. The airman involved had filled the paper cup with calcium hypochlorite and was holding it when the cup began to glow and then burst into flames.

In the excitement produced by this unexpected reaction, the flaming cup was inadvertently dropped into a nearby 100-pound drum of calcium hypochlorite, resulting in a fire and explosion, and toxic fumes were liberated from the burning material. Two men were burned and one suffered temporarily from the inhalation of chlorine gas. None of the injuries was serious.

After several experiments to determine the cause of this accident, some facts were determined. By adding slight amounts of coffee, cream,

and sugar to calcium hypochlorite, a fire and small explosion could be produced. This phenomenon seemed to take place only when some sort of moisture and sugar were present together. Similar results could not be produced when the cup contained sugar, water, or cream alone.

Although the reason for this accident may not be entirely clear, it is obvious that similar mishaps can be avoided if only clean cups made of hard rubber or plastic are used when dealing with calcium hypochlorite. (Safety Review, 16:5, July 1959)

NOTE: Medical Department personnel should be familiar with the precautions contained in United States Navy Safety Precautions, OPNAV 34P1, concerning the handling of calcium hypochlorite.

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